

MANAGEMENT OF AGRICULTURALLY IMPORTANT SUCKING PESTS OF COTTON

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Cotton is one of the most important commercial crops in the world. Among the cotton growing countries, India has the largest area of 9.0 million hectare grown under diverse agro – ecological areas. Hargreaves (1948) listed 1326 species of insects and mites recorded on cotton. The great majority of these are of little or no economic importance so far as cotton is concerned, and some, although collected on cotton have not been observed to feed on it. Many are sporadic casual or accidental visitors to the crop. In India Nangpal (1948) recorded nearly 110 species of insects and mites which infest cotton. Fortunately only a relatively small number of insects are of major economic important, but individually or by their combined effect they can cause significant yield loss. Among the *phytophagous* cotton pests, 24 have attained the pest status and the important can be classified as sap feeding insects, bollworms, leaf feeding insects and mites.

1. Cotton Thrips. *Thrips tabaci*, *T. palmi* and *Scirtothrips dorsalis*.(Thripidae – Thysanoptera)

Thrips are generally one of the main early season cotton pests. They initially damage the cotyledons and then several other parts including the bolls and the types of damage vary according to the parts of the plant attacked. Most damage occurs during early vegetative stage of the crop, when nutritional quality of tissues is ideal for these insects. Both adult and nymphs usually remain on the under surface of laves, lacerate the tissues and suck the cell sap. The affected leaves become thickened, blistered and bronzed due to continuous feeding. Feeding on developing bolls, makes them turn brown due to development of necrotic patches. Thickening of boll rind can also be noticed when bolls are attacked, boll opening is affected.

Management

Thrips populations are checked by certain predatory thrips. The predators on d.thrips include *Anthocoridae*, *Lygaidae* and mites. But their role is very limited. The population and damage are more during dry period sprays of systemic insecticide like methyl-o-demeton, acetamiprid, imidacloprid and acephate gives good control of thrips (Dahiya and Singh, 1982).

2. Cotton leafhoppers – *Amrasca devastans* (Cicadelidae – Hemiptera)

Amrasca devastans is the Indian cotton jassid, previously referred to as *A. biguttula* or *Empoasca devastans*. Though, eight species of jassids has been reported to feed on cotton *A. devastans* is the most dominant and distributed in all the cotton growing regions of India.



Leaf hoppers (Jassids) feed on cotton as well as a wide range of other host plants. They apparently introduce a toxin that impairs photosynthesis in proportion to the amount of feeding, and this causes the edges of leaves to curl downwards, the leaf becomes yellowish and then reddens. Severe 'hopper burn' leads to shedding of reproductive parts and can severely stunt young plants and reduce yields.

Management

Cotton varieties having glabrous leaves are highly susceptible to jassids as compared to hairy (hirsute) varieties. The susceptibility is correlated with both density and length of hairs on the under surface of leaf particularly on veins where the jassid feeds and lays eggs. High hair density without length is ineffective. SRT 1, MCU 5 and LRK 516 are some of the popular resistant varieties grown in India.

Natural enemies are not considered to have a significant effect on the population of jassids, although a number of egg parasitoids have been recorded. The parasitoid *Anagrus sp* has been recorded, but it does not play any significant role in reducing the population (Subba Rao et al., 1968). Insecticides are commonly necessary when the jassid population reaches 2 – 3 nymphs/leaf, although for glabrous cultivars the threshold may be lowered to one per leaf. Application of any of the systemic insecticides like methyl-o-demeton, imidacloprid, thiomethoxam or acetamiprid gives good control of jassid. The insecticides like chlorpyrifos, quinalphos and endosulfan are not effective against this pest. Very often the cotton fields treated with these insecticides recorded high jassid population than the untreated check. Treating the seeds with imidacloprid or thiomethoxam @ 7 – 10 g/kg of seeds before sowing of cotton gives good control of this pest up to 45 days after sowing.

3. Cotton Aphids - *Aphis gossypii* (Aphididae – Homoptera)

Aphis gossypii is a cosmopolitan species widely distributed in all the cotton growing regions of India. Earlier, it was considered as an early season minor pest, but now causes serious damage particularly in cotton fields after the use of synthetic pyrethroids which include resurgence of this pest (Natarajan et al., 1986). The degree of damage depends on the period of attack, insecticides previously used and the weather conditions. A dry weather with prolonged drought favours the fast build up of this pest. Aphids remain in colonies on the undersurface of leaves and terminal shoots and suck the plant sap and this affects the general vigour of the plant. Shedding of fruiting bodies and quality of the fibre are also affected. In addition to the direct damage the 'Honeydew' excreted by aphids deposited on the upper surface of lower leaves, over which sooty mould develops which interferes with photosynthesis of the plant. Honeydew may also drip on to the open bolls causing 'stickiness' of lint (fibre).

Management

Aphids are preyed upon by several species of *coccinellids*, *chrysopids* and *syrphids*. The parasitoid *Aphelinus gossypii* also plays an important role in reducing the population during cooler months of the year. A high degree of control is normally exerted by these natural enemies. Growing cowpea as under intercrops or on the irrigation bunds increases the natural enemy build up (Natarajan and Seshadri, 1988).



Unless the attack is severe it is better to leave control to natural enemies as the early application of insecticides may result in heavier attack by more serious pests later in the season. Sowing the cotton seeds treated with insecticides (Imidacloprid, or Thiomethoxam) gives protection to the crop up to 45 days. The insecticides like methyl-o-demeton, imidacloprid, acetamiprid or thiomethoxam gives good control of this pest.

4. Cotton whitefly – *Bemisia tabaci* (Aleyrodidae – Homoptera).

The cotton whitefly, an occasional pest of cotton in India has emerged as a major pest of cotton. Severe outbreak was first observed in Guntur region of Andhra Pradesh during 1984 – 85 seasons and now continuous to be in all the cotton growing regions of India (Natarajan et al., 1987) In addition to direct pest it also acts as a vector of cotton leaf curl virus in north zone. The nymphs and adults remain in colonies on the under surface of leaves and suck the plant sap. Due to continuous feeding chlorotic spots develop on the leaves which later coalesce and the leaves become reddish, brittle and finally drop prematurely. This results in reduced nutrition to the plant leading to stunting, shedding of fruiting bodies and reduction in boll size. The bolls are also forced to burst prematurely leading to poor quality lint. The 'honeydew' excreted by whitefly drops on the upper surface of lower leaves and bolls which favour the development of black sooty mould on the leaves, which in turn reduces photosynthesis and physiology of leaves. Heavy fungal growth on honeydew leads to premature leaf drop. Honeydew on open bolls causes stickiness of cotton which interferes with picking, ginning and spinning thus the lint value is reduced.

In addition to *B. tabaci* the spiraling whitefly, *Aleurodichus* disperses also attack cotton and cause similar damage as cotton whitefly. *A. dispersus* is more common in summer cotton rather than winter cotton.

Management

Several species of Aphelinid parasitoids play vital role in suppressing the population of *B. tabaci*. The important parasitoids are *Eretmocerus mundus* and *Enacarsia sp* and the natural parasitism was up to 85 per cent (Natarajan, et al 1987). In addition the predators *Amblyseius sp* (predatory mite), the green lacewing bug (*Chrysoperla sp*) the coccinellids *Brumus sp*, *Scymnus* and *Menochilus* also play important role in reducing whitefly build up. In general the whitefly population is higher on hairy (hirsute) varieties. The glabrous cultivars (L.K. 861, Kanchara and Supriya) are observed to be tolerant to whitefly. Application of most of the contact and systemic insecticides (monocrotophos, acephate etc) were observed to increase whitefly build up. Applications of neem products like neem oil, neem seed kernel extract were found effective. Among the synthetic insecticides, triazophos observed to be effective.

5. Red Cotton bugs - *Dysdercus cingulatus*, *D. koenigi* and *D. similis* (Pyrrhocoridae – Hemiptera)

Red cotton bugs also called as cotton stainers occur on cotton during peak boll formation stages of cotton. They are generally gregarious, bright red coloured. They



are not serious pests but at time cause considerable damage to developing seeds impairing seed viability as well as staining the *kapas*.

Management

In general, red cotton bugs are not serious on cotton. But in recent years moderate infestation of this pest has been recorded on transgenic Bt cotton.

6. Mirid bug: *Ragnus spp* (*Miridae – Hemiptera*).

Nymphs and adults are yellowish green. They suck the sap and due to the feeding on squares and bolls flare up. Due to the feeding squares and young bolls drops. These mired bugs are observed to be serious pest on Bt cotton.

7. Dusky cotton bugs - *Oxycaremus laetus o.hyalinipennis* (*Lygaeidae: Hemiptera*).

The Lygaeids also called as cotton seed bugs occur on cotton during the bursting stage of the crop and they suck the sap from the seeds. Both nymphs and adults can be seen in the burst bolls. They are gregarious small, slender' and sluggish insects with black or brown coloured membranous wings. When the population is large, the seed weight is reduced and the seed germination is also impaired.

